AMENDMENT TO THE CLAIMS

1. (currently amended) A method for damping feed-back vibrations of a metallic tool during the chip removing machining of a metal workpiece comprising the steps of:

A. causing a sensor device to detect an oscillatory motion of the tool;

B. causing a control device to identify the frequency of the oscillatory motion detected in step A; and

C. causing a vibration damping device to generate a mechanical damping force having substantially the same frequency as the frequency identified in step B and applied to the tool in counter-direction to a velocity of the oscillatory motion <u>and out-of-phase therewith by other than 180 degrees</u>.

2. (original) The method according to claim 1 wherein step C includes applying the damping force to the tool out of phase by 60° - 120° relative to the oscillatory motion.

3. (original) The method according to claim 1 wherein step C includes applying the damping force to the tool out of phase by 240°-300° relative to the oscillatory motion.

4. (original) The method according to claim 1 wherein step C includes applying the damping force to the tool out of phase by 70°-110° relative to the oscillatory motion.

5. (original) The method according to claim 1 wherein step C includes applying the damping force to the tool out of phase by 250°-290° relative to the oscillatory motion.

6. (original) The method according to claim 1 wherein step C includes applying the damping force to the tool out of phase by 80°-100° relative to the oscillatory motion.

7. (original) The method according to claim 1 wherein step C includes applying the damping force to the tool out of phase by 260°-280°relative to the oscillatory motion.

8. (original) The method according to claim 1 wherein step C includes applying the damping force to the tool out of phase by 90° relative to the oscillatory motion.

9. (original) The method according to claim 1 wherein step C includes applying the damping force to the tool out of phase by 270° relative to the oscillatory motion.

10. (currently amended) ~~the~~ The method according to claim 1 wherein the damping force generated in step C is in the range of 50-1500 Hz.

11. (original) The method according to claim 1 wherein step C includes causing a piezo element of the mechanical damping device to generate the damping force.

12. (original) The method according to claim 1 wherein step C includes causing a hydraulic cylinder of the mechanical damping device to generate the damping force.

13. (original) The method according to claim 1 wherein step C includes causing a pneumatic cylinder of the mechanical damping device to generate the damping force.

14. (original) The method according to claim 1 wherein step C includes causing an electromagnetic device of the mechanical damping device to generate the damping force.

15. (original) The method according to claim 1 wherein step B further includes causing the control device to identify an amplitude of the oscillatory motion, and wherein the mechanical damping force generated by the vibration damping device is of gradually decreasing amplitude.

16. (currently amended) A vibration damping system for damping feed-back vibrations of a mechanical tool during the chip-removing machining of metal workpieces, the apparatus comprising:

a sensor device for detecting an oscillatory motion of the tool during a machining operation;

a control device operably connected to the sensor device for identifying a frequency of the oscillatory motion sensed by the sensor device; and

a vibration damping device for generating a mechanical damping force having substantially the same frequency as the oscillatory motion and a counter-direction relative to the direction of the velocity of the oscillatory motion, and for applying the damping force out-of-phase therewith by other than 180 degrees.

17. (original) The vibration system according to claim 16 wherein the control device identifies an amplitude of the oscillatory motion, and the vibration damping device generates a damping force of gradually decreasing amplitude.

18. (currently amended) A metal cutting apparatus for the chip removing machining of metal workpieces, the apparatus comprising:

a metal-cutting tool; and

a vibration damping system operably connected to the tool and comprising:

a sensor device for detecting an oscillatory motion of the tool during a machining operation;

a control device operably connected to the sensor device for identifying a frequency of the oscillatory motion sensed by the sensor device, and

a vibration damping device for generating a mechanical damping force having substantially the same frequency as the oscillatory motion and applied to the tool shaft in counter-direction to a velocity of the oscillatory motion and out-of-phase therewith by other than 180 degrees.

19. (original) The apparatus according to claim 18 wherein the damping force is applied to the tool out of phase by 60° - 120° relative to the oscillatory motion.

20. (original) The apparatus according to claim 18 wherein the damping force is applied to the tool out of phase by 240°-300° relative to the oscillatory motion.

21. (original) The apparatus according to claim 18 wherein the damping force is applied to the tool out of phase by 70°-110° relative to the oscillatory motion.

22. (original) The apparatus according to claim 18 wherein the damping force is applied to the tool out of phase by 250°-290° relative to the oscillatory motion.

23. (original) The apparatus according to claim 18 wherein the damping force is applied to the tool out of phase by 80°-100° relative to the oscillatory motion.

24. (original) The apparatus according to claim 18 wherein the damping force is applied to the tool out of phase by 260°-280°relative to the oscillatory motion.

25. (original) The apparatus according to claim 18 wherein the damping force is applied to the tool out of phase by 90° relative to the oscillatory motion.

26. (original) The apparatus according to claim 18 wherein the damping force is applied to the tool out of phase by 270° relative to the oscillatory motion.

27. (original) The apparatus according to claim 18 wherein the damping force is in the range of 50-1500 Hz.

28. (original) The apparatus according to claim 18 wherein a piezo element of the mechanical damping device generated the damping force.

29. (original) The apparatus according to claim 18 wherein a hydraulic cylinder of the mechanical damping device generates the damping force.

30. (original) The apparatus according to claim 18 wherein a pneumatic cylinder of the mechanical damping device generates the damping force.

31. (original) The apparatus according to claim 18 wherein an electromagnetic device of the mechanical damping device generates the damping force.

32. (original) The apparatus according to claim 18 wherein the control device identifies an amplitude of the oscillatory motion, and the vibration damping device generates a mechanical damping force of gradually decreasing amplitude.